

United States Patent [19]  
Yukitake et al.

[11] Patent Number: 5,745,182  
[45] Date of Patent: Apr. 28, 1998

[54] METHOD FOR DETERMINING MOTION  
COMPENSATION

0395440A2 10/1990 European Pat. Off. .  
0447068A2 9/1991 European Pat. Off. .  
0484140A2 5/1992 European Pat. Off. .

[75] Inventors: Takeshi Yukitake; Shuji Inoue, both of  
Yokohama, Japan

# OTHER PUBLICATIONS

[73] Assignee: Matsushita Electric Industrial Co.,  
Ltd., Osaka, Japan

A. Puri, et al, "Video Coding with Motion-Compensated  
Interpolation for CD-ROM Applications", Signal Process-  
ing, Image Communication, vol. 2, No. 2, pp. 127-144, Aug.  
1990.

[21] Appl. No.: 278,010

K. Kinuhata, et al, "Universal Digital TV Codec —Unico-  
dec", 7th International Conference on Digital Satellite Com-  
munications, May 1986, pp. 281-288.

[22] Filed: Jul. 20, 1994

## Related U.S. Application Data

(List continued on next page.)

[62] Division of Ser. No. 970,046, Nov. 2, 1992, Pat. No.  
5,369,449.

## [30] Foreign Application Priority Data

Nov. 8, 1991 [JP] Japan ..... 3-293004  
Jul. 9, 1992 [JP] Japan ..... 4-181980

[51] Int. Cl.<sup>6</sup> ..... H04N 7/32  
[52] U.S. Cl. .... 348/416; 348/699  
[58] Field of Search ..... 348/413, 416,  
348/699, 400-402, 407, 409-412, 384,  
390, 415; 382/232, 236, 238; H04N 7/137

## [56] References Cited

### U.S. PATENT DOCUMENTS

4,691,230 9/1987 Kaneko et al. .... 348/699  
4,362,266 8/1989 Gillard ..... 348/699  
4,864,294 9/1989 Gillard .  
4,989,089 1/1991 Chantelou et al. .

(List continued on next page.)

### FOREIGN PATENT DOCUMENTS

0395271A2 10/1990 European Pat. Off. .

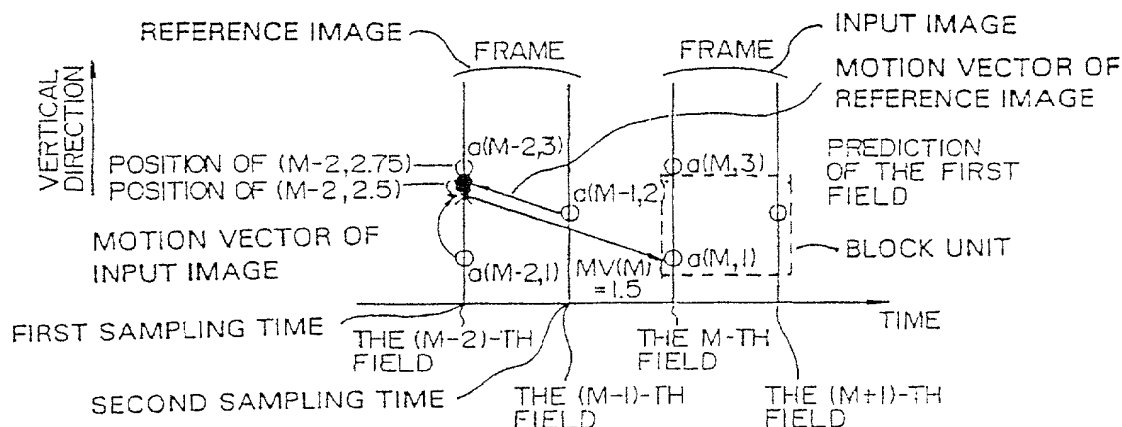
Primary Examiner—Richard Lee

Attorney, Agent, or Firm—Watson Cole Stevens Davis,  
P.L.L.C.

## [57] ABSTRACT

A method for predicting motion compensation for determin-  
ing of an input image based on a motion vector of the input  
image from this input image to a reference image which has  
been sampled at a first set time, and the method includes  
calculating a motion vector of the input image based on a  
move, at a second set time, of a block unit which is a part  
of the input image and consists of a plurality of pixels, and  
calculating a motion vector of the reference image based on  
a move, at the first set time, of a block unit which is a part  
of the reference image and consists of a plurality of pixels.  
Move compensation of the input image is calculated both  
from the motion vector of the input image and from the  
motion vector of the reference image, to thereby realize a  
method for determining motion compensation with high  
precision.

3 Claims, 6 Drawing Sheets



## U.S. PATENT DOCUMENTS

4,998,168	3/1991	Gillard	348/699
5,021,881	6/1991	Avis et al.	348/699
5,027,205	6/1991	Avis et al.	348/699
5,036,393	7/1991	Samad et al.	348/699
5,049,991	9/1991	Niihara	358/105
5,072,293	12/1991	De Haan et al.	348/699
5,093,720	3/1992	Krause et al.	358/133
5,105,271	4/1992	Niihara	358/105
5,132,792	7/1992	Yonemitsu et al.	358/105
5,138,446	8/1992	Guichard et al.	348/699
5,142,361	8/1992	Tayama et al.	348/699
5,144,427	9/1992	Kitaura et al.	358/105
5,157,742	10/1992	Niihara	348/699
5,162,907	11/1992	Keating et al.	358/105
5,175,618	12/1992	Ueda et al.	358/105
5,191,414	3/1993	Sugiyama	
5,200,820	4/1993	Gharavi	358/105
5,210,605	5/1993	Zaccarin et al.	358/105
5,424,779	6/1995	Odaka et al.	348/699
5,436,674	7/1995	Hirabayashi et al.	348/699

## OTHER PUBLICATIONS

M. Hoetter, "Differential Estimation of the Global Motion Parameters Zoom and Pan", Signal Processing, European Journal Devoted to the Methods and Applications of Signal Processing, vol. 16, No. 3, Mar. 1989, pp. 249-265.

Patent Abstracts of Japan, vol. 016, No. 097 (E-1176) 10 Mar. 1992 & JP-A-03 276 988 (Victor Company of Japan Ltd) 9 Dec. 1991.

"Transmission of Component-Coded Digital Television Signals for Contribution-Quality Applications at the Third Hierarchical Level of CCITT Recommendation G.702," CCITT Recommendation 723 of CMTT, 1990.

Takeshi Yukitake, "Field-Time Adjusted MC for Frame-Base Coding (2)" International Organization for Standardization ISO/IEC/JTC1/SC29/WG11 MPEG92/100, Mar. 11, 1992.

Takeshi Yukitake, "Field-Time Adjusted MC for Frame-Base Coding" CCITT SGXV Working Party XV/1 Experts Group for ATM Video Coding, AVC-194 MPEG 92/024s, Dec. 1991.

Shuji Inoue, et al "Motion Compensation Method for Interlace Video" Spring conference of the Institute of Electronics Information and Communication Engineers of Japan, 1992.

098681 03001  
F00050 F089950